

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

- 1.(currently amended) A composition ~~for preparing~~ capable of forming a stimuli responsive hybrid hydrogel comprising a polymeric network consisting essentially of a water soluble polymer crosslinked by a protein domain having a coiled-coil structure, wherein said water soluble polymer is a member selected from the group consisting of copolymers of N-substituted methacrylamides, copolymers of N, N-disubstituted acrylamides, hydrophilic esters of methacrylic or acrylic acid, N-vinylpyrrolidone, N-acryloylmorpholine, sulfoethylmethacrylate, acrylic and methacrylic acid, di-block copolymers of polyethylene oxide (PEO) and polypropylene oxide (PPO), and tri-block copolymers of polyethylene oxide (PEO) and polypropylene oxide (PPO).
- 2.(withdrawn) A composition according to Claim 1 wherein the crosslinking of the protein domain to the polymer is by means of non-covalent bonding selected from the group consisting of chelation bonding, coordination bonding, biotin-avidin bonding, protein-protein interaction and protein-ligand interaction.
3. (withdrawn) A composition according to Claim 2 wherein the crosslinking of the protein domain to the polymer is by means of chelation bonding.
4. (withdrawn) A composition according to Claim 2 wherein the crosslinking of the protein domain to the polymer is by means of biotin-avidin bonding.
5. (withdrawn) A composition according to Claim 2 wherein the crosslinking of the protein domain to the polymer is by means of protein-protein interaction.
6. (withdrawn) A composition according to Claim 2 wherein the crosslinking of the protein domain to the polymer is by means of protein-ligand interaction.
- 7.(original) A composition according to Claim 1 wherein the crosslinking of the protein domain to the polymer is by means of covalent or coordination bonding.
- 8.(canceled) A composition according to either Claims 2 or 7 wherein the protein domain has a coiled-coil structure.
9. (withdrawn) A composition according to either Claims 2 or 7 wherein the protein domain is a recombinant protein domain.
10. (cancelled) A composition according to either Claims 2 or 7 wherein the water soluble polymer is a member selected from the group consisting of copolymers of N-substituted methacrylamides, copolymers of N, N-disubstituted acrylamides, hydrophilic esters of

methacrylic or acrylic acid, N-vinylpyrrolidone, N-acryloylmorpholine, sulfoethylmethacrylate, acrylic and methacrylic acid, di-block copolymers of polyethylene oxide (PEO) and polypropylene oxide (PPO), and tri-block copolymers of polyethylene oxide (PEO) and polypropylene oxide (PPO) and the derivatives thereof.

11. (withdrawn) A composition according to Claim 10 wherein the water soluble polymer is an N-substituted methacrylamide and the derivatives thereof.

12. (currently amended) A composition according to Claim ~~11~~ 10 wherein the N-substituted methacrylamide is a member selected from the group consisting of N-(2-hydroxypropyl)methacrylamide (HPMA), copolymers of N-(N',N'-dicarboxymethylaminopropyl)methacrylamide (DAMA), and copolymers of HPMA and N-(3-aminopropyl)methacrylamide ~~and the derivatives thereof.~~

13. (currently amended) A composition according to Claim ~~10~~ 1 wherein the water soluble polymer is a member selected from the group consisting of di-block copolymers of polyethylene oxide (PEO) and polypropylene oxide (PPO), tri-block copolymers of polyethylene oxide (PEO) and polypropylene oxide (PPO) ~~and the derivatives thereof.~~

14. (currently amended) A composition according to Claim ~~10~~ 1 wherein the water soluble polymer is copolymer of a member selected from the group consisting N, N-disubstituted acrylamides, hydrophilic esters of methacrylic or acrylic acid, N-vinylpyrrolidone, N-acryloylmorpholine, sulfoethylmethacrylate, acrylic and methacrylic acid ~~and the derivatives thereof.~~

15. (currently amended) A composition according to ~~either Claims 2 or 7~~ Claim 1 wherein the molar ratio of the water soluble polymer to the crosslinking protein domain is within a range of about 1:1 ~~and to~~ 1:500.

16.(original) A composition according to Claim 15 wherein the molar ratio of the water soluble polymer to the crosslinking protein domain is within a range of about 1:1 to 1:300.

17. (currently amended) A composition according to ~~either Claims 2 or 7~~ Claim 1 further comprising a bioactive agent.

18. (original)A composition according to 17 wherein the bioactive agent is an oligo- or polypeptide.

19. (withdrawn) A composition according to 18 wherein the peptide is conjugated with the crosslinking protein domain.

20. (withdrawn) A composition according to 17 wherein the bioactive agent is DNA or RNA.

21. (original) A stimuli responsive hydrogel comprising the composition of claim 1 in a three dimensional aqueous solution swelled state.
22. (withdrawn) A stimuli responsive hydrogel according to Claim 21 wherein the crosslinking of the protein domain to the polymer is by means of non-covalent bonding selected from the group consisting of chelation bonding, coordination bonding, biotin-avidin bonding, protein-protein interaction and protein-ligand interaction.
23. (withdrawn) A stimuli responsive hydrogel according to Claim 22 wherein the crosslinking of the protein domain to the polymer is by means of chelation bonding.
24. (withdrawn) A stimuli responsive hydrogel according to Claim 22 wherein the crosslinking of the protein domain to the polymer is by means of biotin-avidin bonding.
25. (withdrawn) A stimuli responsive hydrogel according to Claim 22 wherein the crosslinking of the protein domain to the polymer is by means of protein-protein interaction.
26. (withdrawn) A stimuli responsive hydrogel according to Claim 22 wherein the crosslinking of the protein domain to the polymer is by means of protein-ligand interaction.
27. (original) A stimuli responsive hydrogel according to Claim 21 wherein the crosslinking of the protein domain to the polymer is by means of covalent or coordination bonding.
28. (cancelled) A stimuli responsive hydrogel according to either Claims 21 or 27 wherein the protein domain has a coiled-coil structure.
29. (withdrawn) A stimuli responsive hydrogel according to either Claims 21 or 27 wherein the protein domain is a recombinant protein domain.
30. (cancelled) A stimuli responsive hydrogel according to either Claims 21 or 27 wherein the water soluble polymer is a member selected from the group consisting of copolymers of N-substituted methacrylamides, copolymers of N, N-disubstituted acrylamides, hydrophilic esters of methacrylic or acrylic acid, N-vinylpyrrolidone, N-acryloylmorpholine, sulfoethylmethacrylate, acrylic and methacrylic acid, di-block copolymers of polyethylene oxide (PEO) and polypropylene oxide (PPO), and tri-block copolymers of polyethylene oxide (PEO) and polypropylene oxide (PPO) and the derivatives thereof.
31. (withdrawn) A stimuli responsive hydrogel according to Claim 30 wherein the water soluble polymer is an N-substituted methacrylamide and the derivatives thereof.
32. (currently amended) A stimuli responsive hydrogel according to Claim ~~34~~ 21 wherein the N-substituted methacrylamide is a member selected from the group consisting of N-(2-

hydroxypropyl)methacrylamide (HPMA), copolymers of N-(N',N'-dicarboxymethylaminopropyl)methacrylamide (DAMA), and copolymers of HPMA and N-(3-aminopropyl)methacrylamide ~~and the derivatives thereof.~~

33. (currently amended) A stimuli responsive hydrogel according to Claim ~~30~~ 21 wherein the water soluble polymer is a member selected from the group consisting of di-block copolymers of polyethylene oxide (PEO) and polypropylene oxide (PPO), tri-block copolymers of polyethylene oxide (PEO) and polypropylene oxide (PPO) ~~and the derivatives thereof.~~

34. (currently amended) A stimuli responsive hydrogel according to Claim ~~30~~ 21 wherein the water soluble polymer is a copolymer of a member selected from the group consisting N, N-disubstitued acrylamides, hydrophilic esters of methacrylic or acrylic acid, N-vinylpyrrolidone, N-acryloylmorpholine, sulfoethylmethacrylate, acrylic and methacrylic acid ~~and the derivatives thereof.~~

35. (currently amended) A stimuli responsive hydrogel according to ~~either~~ Claim 21 ~~or 27~~ wherein the molar ratio of the water soluble polymer to the crosslinking protein domain is within a range of about 1:1 ~~and~~ to 1:500.

36. (currently amended) A stimuli responsive hydrogel according to Claim 35 wherein the ~~molar~~ molar ratio of the water soluble polymer to the crosslinking protein domain is within a range of about 1:1 ~~and~~ to 1:300.

37. (currently amended) A stimuli responsive hydrogel according to ~~either~~ Claim 21 ~~or 27~~ further comprising a bioactive agent.

38. (currently amended) A stimuli responsive hydrogel according to Claim 37 wherein the bioactive agent is an oligo- or poly- peptide.

39. (withdrawn) A stimuli responsive hydrogel according to 38 wherein the peptide is conjugated the crosslinking protein domain.

40. (withdrawn) A stimuli responsive hydrogel according to 37 wherein the bioactive agent is DNA or RNA molecule.

41. (currently amended) A stimuli responsive hydrogel according to Claim 37 wherein the bioactive agent is ~~saluted~~ dissolved in the an aqueous solution.

42. (currently amended) A stimuli responsive hydrogel according to ~~either~~ Claim 21 ~~or 27~~ wherein the aqueous solution in an equilibrium swollen state is within a range of between 1 to 99% (w/w).

43. (currently amended) A stimuli responsive hydrogel according to ~~either~~ Claims 42 ~~or 27~~

wherein the aqueous solution in an equilibrium swollen state is within a range of between 5 to 99% (w/w).

44. (currently amended) A stimuli responsive hydrogel according to ~~either~~ Claims 43 ~~or~~ 27 wherein the aqueous solution in an equilibrium swollen state is within a range of between 10 to 99% (w/w).